detecting a pressure acting on [a] the resin during an injection/dwell stage of the injection pressure control to generate an injection pressure waveform based on a function of time; and

setting said [detected] generated injection pressure waveform as a target injection pressure waveform for pressure feedback control in the injection/dwell stage.

REMARKS

I. Introduction

Reconsideration of this application, as presently amended, is respectfully requested. Claims 1-12 are pending in this application. Claims 1-12 stand rejected.

Claim 1 has been amended to improve its form without changing the scope of the claim. Specifically, in line 7, "a resin" is changed to "the resin" to clarify antecedent basis. Further, in line 10 of claim 1 "detected" is changed to --generated-- to more precisely indicate the injection pressure waveform referred to in line 10.

It is noted that the 35 USC §112, first paragraph rejection set forth in the previous Office Action issued in the parent application has been withdrawn.

II. Rejection Under 35 USC §101

In Item 1, page 2 of the Office Action, claims 9-12 were rejected under 35 USC §101 because the invention set forth in these claims is allegedly directed to non-statutory subject matter. The Examiner alleges that claims 9-12 recite a mathematical algorithm. For the reasons set forth in detail below, it is respectfully submitted that each of claims 9-12 recite statutory subject matter in accordance with 35 USC §101.

In order for the method claims 9-12 to recite non-statutory subject matter for reciting a mathematical algorithm, the claims must first be found to either directly or indirectly recite a mathematical algorithm, thus pre-empting all uses of the mathematical algorithm. It is submitted that none of claims 9-12 either directly or indirectly recite a mathematical algorithm. More specifically, since no algorithm is literally recited in the claimed steps, the claims can not directly recite a mathematical

algorithm. Further, claims 9-12 do not indirectly recite a mathematical algorithm. To determine whether a claim indirectly recites a mathematical algorithm, reference to the specification must be made to determine whether the claimed terms indirectly recite mathematical calculations, formulae or equations. Looking to the specification, it can be seen that the steps recited in claims 9-12 do not correspond to mathematical algorithms. Therefore, it is respectfully submitted that because the present claims 9-12 do not directly or indirectly recite a mathematical algorithm, the present claims can not pre-empt all uses of any explicit or underlying mathematical algorithm or equation, and therefore the claims define statutory subject matter under §101.

Further, if the Examiner maintains the assertion that a mathematical algorithm is recited in any of claims 9-12, the Examiner is respectfully requested to specifically point out the claimed steps which allegedly recite a mathematical algorithm to clearly define the issue so that Applicant may respond particularly to the Examiner's assertions in the Office Action. As the §101 rejection now stands, the Examiner has asserted that claims 9-12 contain a mathematical algorithm without pointing out which step or steps recite the mathematical algorithm.

For the reasons set forth above, it is respectfully submitted that each of claims 9-12 define statutory subject matter under 35 USC §101. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §101 are respectfully requested.

III. Rejection of the Claims in View of the Prior Art

In Item 3 of the Office Action, claim 10 was rejected under 35 USC §102(b) as being clearly anticipated by European Patent Application 299,085 to Hara. In Item 5 of the Office Action, claims 1-9, 11 and 12 were rejected under 35 USC §103 as being unpatentable over European Patent Application 299,085 to Hara. For reasons set forth in detail below, these rejections are respectfully traversed.

Hara is directed to a method and apparatus for setting an injection pressure of an injection molding machine. According to Hara, a time-injection pressure characteristic curve consisting of a part corresponding to a filling step and a part

corresponding to a holding step (see FIG. 1) is used to sequentially set a series of pressures for injection molding. A molded product of the best quality is achieved by setting holding pressures (during the holding step) according to an exponential curve, without relying upon multiple stage setting (see page 6, lines 16-19). Further, Hara discloses setting a precise injection pressure by forming a time-injection pressure characteristic curve corresponding to the type of molded product. More particularly, the Hara reference discloses a method and apparatus for molding products with an injection molding machine which changes molding conditions in dependence on a shape of the molded product (e.g., a simple shape or a complicated shape, see, e.g., page 8, lines 17-20 of Hara). According to Hara, first, a judgement is made as to whether the shape of the molded product is complicated. If the shape is a complicated shape, a part of the time-injection pressure characteristic curve is "cut" as shown in Fig. 4. When the molded product is of a simple shape, the time-injection pressure characteristic curve is followed without cutting the curve during the molding process. A judgement is then made as to whether the molded product is thick or thin, and, the time-injection pressure characteristic is adjusted accordingly to lengthen or shorten, respectively, the holding step time duration.

A function generator 41 generates a function which determines a pattern for realizing at time-injection pressure characteristic curve. The function generator is supplied with parameters from an input device 45 (see page 11, lines 8-15), and a signal generator 46 generates a signal which modifies the output of the function generator, e.g., "cuts" a part of a time-injection pressure characteristic curve (see, e.g., page 11, lines 25-28). The results of the judgements as to whether the molded product is thick or thin, or of a complicated shape, are supplied as a parameter from the input device 45 to the function generator 41 and signal generator 46.

The invention presently recited in claim 1 differs from Hara in the method for setting an injection pressure waveform for injection pressure control. Specifically, according to the invention recited in claim 1, the pressure detected during an injection/dwell stage is used to set a target injection pressure waveform, whereas, in contrast, Hara discloses a method by which an injection pressure waveform is set by

modifying a predetermined time-injection pressure characteristic curve in correspondence with a type of molded product (e.g., complicated shaped or uncomplicated shaped). More particularly, the method disclosed by Hara involves modifying a time-pressure injection characteristic, according to a parameter indicating a type of molded product, with a pulse supply instruction generated by a function generator 45. According to the invention as presently recited in claim 1, at least one molding condition for injection pressure control is adjusted, injection pressure control is performed on the at least one adjusted molding condition, and based upon detected pressure acting on the resin and during an injection/dwell stage of the injection pressure control, an injection pressure waveform is generated and set as a target injection pressure waveform. Hara does not disclose or suggest setting an injection pressure waveform based upon performing injection pressure control and detecting a pressure acting on a resin during the injection pressure control.

Further, according to Hara the injection pressure waveform is fed to an injection section 20 as a pressure control signal 34. A pressure detection signal 31 is supplied to a control section 40. However, Hara does not provide any suggestion that the pressure detection signal 31 is utilized for feedback control, as presently claimed.

Still Further, Hara does not disclose or suggest the method recited in independent claim 4 wherein an injection pressure waveform is set according to an injection pressure waveform stored for a first mold, and the injection pressure waveform is displayed, modified and set for a second mold. Hara does not disclose or suggest the apparatus recited in independent claims 5 and 6 including an injection pressure waveform changing means for modifying a selected one of an injection pressure waveform by designating two points and a point in between the two points to form a curve, thus modifying the injection pressure waveform which is then set and used for injection molding. Still further, Hara is silent with respect to storing detected pressures in a memory to generate an injection pressure waveform, as recited in claim 9. Hara is also silent about modifying a portion of the injection pressure waveform based on a display of the injection pressure waveform and storing the modified injection pressure waveform in memory, as recited in claim 10. In summary, the

method of modifying the time-injection pressure characteristic taught by Hara does not suggest or render obvious the claimed invention. In the absence of a suggestion of the above features, it is respectfully submitted that each of independent claims 1, 4, 5, 6, 9 and 10 patentably distinguish over the cited prior art and therefore define allowable subject matter.

It is also respectfully submitted that each of the dependent claims define additional features not disclosed or suggested by the cited prior art. For example, claim 2 recites repeating the steps of adjusting, performing and detecting until a conforming molded article is obtained and performing the setting step when the conforming molded article is obtained. Dependent claim 7 recites a step of designating first and second points on a first injection pressure waveform and changing a portion of the first injection pressure waveform between the first and second points into a straight line to generate the second injection pressure waveform. Dependent claim 8 recites changing an injection pressure waveform into an arc to modify the injection pressure waveform. These and other features found in the dependent claims are not disclosed or suggested by the cited prior art and, therefore, are not rendered obvious by the cited reference.

Accordingly, it is respectfully submitted that each of claims 1-12 patentably distinguish over the cited prior art and therefore define allowable subject matter. Reconsideration and withdrawal of the rejections under §102 and 103 are therefore respectfully requested.

IV. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that each of the claims distinguish over the prior art and therefore define patentable subject matter. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are therefore respectfully requested.

Should there be any remaining questions to correct formal matters, it is urged that the Examiner contact the undersigned at his convenience for a telephone interview to expedite and complete prosecution.

If any further fees are required in connection with the filing of this Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

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